Health Consultation

SWIFT AGRICULTURAL CHEMICALS FAIRMONT CITY PLANT

FAIRMONT, ST. CLAIR COUNTY, ILLINOIS

CERCLIS NO. ILD059995423

APRIL 10, 1998

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared by:

Illinois Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The Illinois Environmental Protection Agency (IEPA) requested that the Illinois Department of Public Health (IDPH) review information gathered for the Swift Agricultural Chemicals Corporation site for any public health implications. The Swift Agricultural Chemicals Corporation site is on 10 acres at 2501 North Kingshighway in Fairmont City, Illinois (population 2,139). Rose Creek and railroad tracks border the site to south. A residential area is next to the railroad tracks. The Old American Zinc site (CERCLIS # IL0000034355) borders the west and north sides of Swift Agricultural Chemicals Corporation. XTRA Intermodal, a tracking company, currently occupies the Old American Zinc site. North Kingshighway borders the east side of Swift Agricultural Chemicals Corporation. Allied Chemical Corporation East St. Louis Works chemical manufacturing plant is across North Kingshighway, east of the site. A chain-link fence surrounds the site.

The Swift Agricultural Chemical site has been occupied since 1931. The original owner of the site was Virginia Carolina Chemical Company. Additional owners of the site and the dates of ownership include Mobile Chemical (1967-1971), Swift and Company (1971-1983), Beatrice (1983-1986) and Vigoro Industry (1986 - present). During Swift and Company ownership of the site, the facility had several different names including Swift Agricultural Chemicals Corporation, Esmarch, and Estech General Chemicals Corporation. The facility opened as a fertilizer production facility in 1931 and operated continuously until 1990. Vigoro Industries leased the property to an individual who remanufactures wood pallets. Pesticides were added with the fertilizer product beginning in 1971. A record of which pesticides were added to the fertilizer was not found in the information reviewed. Raw materials used at the plant included potash, anhydrous ammonia, sulfuric acid, and phosphoric acid.

IEPA received the first complaint regarding the site from the Coast Guard in 1973. The Coast Guard had received a complaint that a white milky substance was being released into Rose Creek. An investigation revealed that an estimated 2,000 to 3,000 gallons of sulfuric acid was released during a spill. On March 7, 1975, an IEPA representative observed a green tint in a drainage ditch north of the site. The green tint was a dye used to color the fertilizer that had apparently run off the site.

Ecology and Environment (E & E) conducted a screening site inspection (SSI) on August 2, 1989, for the U.S. Environmental Protection Agency (USEPA). Activities conducted as part of the SSI were an interview with site representatives, a reconnaissance inspection of the site, and the collection of 5 soil and 7 sediment samples. The locations of the samples are shown in Figure 2.

IEPA conducted a site team evaluation prioritization (STEP) of the Swift Agricultural Chemicals Corporation in 1996. USEPA requested the STEP. The site visit and sampling were conducted on June 3 and 4, 1996. Four soil samples and two groundwater samples were

collected during the STEP. The location of the soil and groundwater samples are shown in Figure 3.

Additional investigations near Swift Agricultural Chemicals Corporation have been conducted in and around the Old American Zinc site. Those investigations have included the CERCLA Integrated Assessment and an IEPA/IDPH meeting and site visit on October 18, 1995. IDPH completed a health consultation for Old American Zinc on February 14, 1996. The conclusions of the Old American Zinc health consultation are presented in Attachment 1.

A summary of all the soil, sediment, and groundwater samples collected at the site is found in Table 1. Eight volatile organic compounds (VOCs) were detected in the soil and sediment samples. Two VOCs were identified in the groundwater samples. Many semivolatile organic compounds were detected in the soil, sediment, and groundwater. Polycyclic aromatic hydrocarbons (PAHs) were frequently detected in the samples. Several inorganic compounds were detected in soils at levels greater than background. The elevated inorganic concentrations are probably due to the proximity of the Old American Zinc site.

DISCUSSION

The primary focus for this discussion is possible exposure to contaminated sediments present off site and the possible health effects related to exposure. The analytical results are listed in the tables, and the comparison values for each contaminant are also presented. Table 2 contains the on-site soil and sediment sampling results. Table 3 contains a list of contaminants, which exceeded comparison value levels, in off-site sediment samples. The contaminants present in groundwater at levels exceeding comparison values are presented in Table 4.

Comparison values are contaminant concentrations in specific, environmental media used to select contaminants for further evaluation. The values include Environmental Media Evaluation Guides (EMEGs) for chronic exposures (CEMEGs) and intermediate exposures (IEMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations are derived from USEPA's cancer slope factors and represent a level at which one excess cancer may occur in one million people exposed to that level. See Attachment 2 for a detailed description of the comparison values used.

The compounds expected to be related to a fertilizer manufacturing plant would primarily be nitrogen compounds, acids (sulfuric and phosphoric), and pesticides mixed with the fertilizer. PAHs, most pesticides, and other inorganic compounds would not be associated with the site. Inorganic compounds and PAHs, from the producer gas plant, have been associated with the neighboring Old American Zinc site.

The groundwater beneath the site was slightly contaminated with Heptachlor and inorganic compounds. Workers and residents are not likely exposed to the contaminants in groundwater

because residential drinking water is provided by a municipal system. Groundwater samples were not tested for nitrates and nitrites; however, because the community is on a municipal system, that information is not needed to evaluate the public health impact of groundwater on people in the area. The nearest community wells are approximately 2 1/2 miles northeast and upgradient of the site. The nearest known residential well is approximately 1/2 mile north of the site. This residential well is upgradient of the site. IDPH collected a sample from this well and analyzed it for inorganic compounds. No inorganic compounds, including nitrates and nitrites, were found.

Table 2 lists the compounds found in the on-site soil and sediment samples. The soil comparison values are presented for a pica child (one who demonstrates excessive hand to mouth activity), a non-pica child, and an adult when appropriate and available. On-site soil and sediment samples contained PAHs, pesticides, and inorganic compounds. Benzo(a)pyrene (BaP) was higher in off-site sediments than it was on-site. That fact suggests that BaP is not site related. The pesticides found at levels greater than comparison values are heptachlor, heptachlor epoxide, aldrin, and dieldrin. We do not know if those compounds were ever used on the site.

The site is fenced, so people are not likely to be chronically exposed to soils on the site. Both past and present on-site workers are the only people who are likely to come in contact with contaminants present in surface soil and sediment. Exposure to the levels of contaminants found in on-site soils is not expected to cause health effects in those workers. Off site, people may come in contact with contaminated sediments. (See Table 6.)

Sediment samples S10 and S11 were taken from culverts along Kingshighway, and samples S7 and S8 were taken along the southwestern corner of the Old American Zinc site. Sample S3 was taken from a drainage ditch northwest of the site, and S9 was taken from a drainage ditch at the southeast corner of the site. BaP was detected at levels greater than comparison values in four of six off-site sediment samples. Heptachlor was detected in 2 samples, one of which was greater than the comparison value. Dieldrin was detected in all six sediment samples at levels greater than comparison values. The sediment sample taken upstream of the site contained the highest level of dieldrin.

Antimony was detected in only one sediment sample, S10, which is upgradient from the site. Arsenic concentrations were above the comparison value for children in samples S7, S8, and S10. Beryllium, cadmium, manganese, thallium, and zinc were highest in the four samples taken along the southern site boundary of Old American Zinc. The zinc smelter site appears to be the source of those metals. Lead concentrations were greater than 1,000 ppm in samples S7, S8, S10, and S11. The sources of lead in the sediments may be related to the Old American Zinc site and the highway.

Contact with surface water or airborne contaminants is not likely to occur on or off the site. The only potential for airborne exposure would be from wind blown dust; however, the levels

of contaminants on the site are not high enough to significantly contaminate the air. Surface water running off the site is not known to flow to a permanent body of water. Children may contact contaminated sediments in off-site areas. Contact with these sediments probably only occurs sporadically and the primary contaminants of concern are inorganic compounds, probably from the zinc smelter.

Childhood Health Initiative

IDPH and ATSDR recognize the sensitivity of children to some of the contaminants found at the site. Therefore, IDPH included estimated doses for children when evaluating site conditions. Estimated doses for children exposed to off-site sediments were calculated for both cancer and noncancer endpoints. Exposure calculations for each contaminant present at levels above comparison values are presented in Attachment 3. Because off-site sediments were not tested for aldrin and heptachlor epoxide, the highest concentrations of those compounds on the site were used to estimate the exposure dose. All estimated doses were calculated using the highest concentration found in off-site sediment. The calculation assumptions are that exposed children weigh 16 kilograms (kg), ingest 100 milligrams of soil per day (mg/day), and contact the sediments two days per week, 6 months per year, for 10 years.

A summary of the estimated doses and a comparison of the doses with their respective noncancer health guidelines is presented in Table 5. No estimated doses for exposure to sediments exceeded chronic noncancer minimum risk levels (MRLs); therefore, children, as described in our assumptions, who contact contaminated sediments are not expected to experience adverse health effects. Additionally, children are not expected to experience an increased risk of developing cancer as a result of exposure to contaminants in off-site sediments.

CONCLUSIONS

1) The Swift Agricultural Chemicals Corporation site does not pose a public health hazard.

2) Children contacting contaminated sediments off the site are not expected to experience adverse health effects. Past and current on-site workers are not expected to experience adverse health effects as a result of contacting surface contaminants.

3) Most contaminants on and off the site are probably not due to the fertilizer operation at the Swift Agricultural Site. They are probably from the Old American Zinc site that borders the site to the north and south.

4) The pesticides found on and off the site may be due to site activities, but that has not been confirmed.

RECOMMENDATIONS

1) Although no hazard is posed by the contaminants found during the site investigation, area residents, especially children, need to reduce or eliminate contact with soil contaminated with arsenic, lead, and cadmium found at the Old American Zinc site. Those issues (Attachment 1) are addressed in a health consultation for Old American Zinc, dated February 14, 1996.

2) The type of pesticides mixed with the fertilizer should be determined to see if pesticides found on and off the site are related to site activities.

PREPARER OF THE REPORT

David R. Webb, M.S.
Environmental Toxicologist
Illinois Department of Public Health

REFERENCES

[1] ATSDR Draft Toxicological Profile for Cadmium. 1991. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[2] ATSDR Draft Toxicological Profile for Arsenic. 1991. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[3] ATSDR Update Toxicological Profile for Polycyclic Aromatic Hydrocarbons. 1993. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[4] ATSDR Update Toxicological Profile for Lead. 1993. Agency for Toxic Substances and Disease Registry, Atlanta, GA.

[5] E & E, Draft Screening Site Inspection Report. December 13, 1989. Chicago, IL

[6] E & E Focused Site Inspection Prioritization Enclosures 1 & 2. September 18, 1995. Chicago, IL

[7] E & E Screening Site Inspection Report for Swift Ag Chem. Fairmont City Plant. May 2, 1990. Chicago, IL

[8] E & E Screening Site Inspection Work Plan for Swift Ag. Chem. Fairmont City Plant. May 2, 1989. Chicago, IL

[9] IDPH, Old American Zinc Health Consultation. February, 1996. Springfield, IL

[10] IEPA, Memorandum from Tom Miller Ofc Collinsville to Division File. August 22, 1989.

[11] IEPA. Site Team Evaluation Prioritization. 1996. Springfield IL

[12] USEPA. Potential Hazardous Waste Preliminary Assessment. Swift Agricultural Chemical Corp. April 4, 1996.

CERTIFICATION

This Swift Agricultural Chemicals Corporation Site Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Gail D. Godfrey
Technical Project Officer
Division of Health Assessment and Consultation
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

for Richard E. Gillig
Chief, State Programs Section
Division of Health Assessment and Consultation
ATSDR

APPENDICES

Table 1 Summary of Environmental Monitoring Results

Table 2 On-Site Soil and Sediment Sampling Results

Table 3 Off-Site Sediment Sampling Results

Table 4 1996 Groudwater Monitoring Results

Table 5 Calculated Doses and Health Guidelines

Table 6 Completed Exposure Pathways

Figure 1 Swift Agricultural Chemicals Corporation Site Location Map

Figure 2 Soil and Sediment Sample Location Map

Figure 3 1996 Soil and Groundwater Sampling Location Map

TABLES

In the data tables that follow, the listing of a contaminant does not mean that it will cause adverse health effects from exposures. The tables summarize data from both the 1989 and 1996 investigations. The tables include the following abbreviations:

J = estimated value, qualitatively correct but quantitatively suspect
B = analyte found in the associated blank and indicates possible/probable blank contamination
P = alternative analytical method used to analyze for this compound
C = Confirmed by GC/MS (for pesticides)
D = Analyzed at a secondary dilution factor
E = Estimated value of a compound that exceeded the calibration range
U = Compound analyzed for but not detected
N = Spiked sample
W = Post digestion spike for furnace AA analysis

Table 1 - Summary of Analyses Conducted at the Swift Agrichemical Facility

Compound/CV	1989 Samples taken by E & E (results in ppm)												Sample Date June 4 and 5, 1996 (results in ppm)								
	Soil	Soil	OS Sed	Sub-Soil	Soil	ONS Sed	OS Sed	OS Sed	OS Sed	OS Sed	OS Sed	SOIL (BKG)	X101	X102	X103	X104	G101	G102	G103	G104	G105
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12									
Methylene Chloride	.008J	.009	.027	.013	.005J	.009J	.030J	-	-	.030J	.028J	.014	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	-	-	.033	-	.054	.046	.240J	.057J	-	.210J	.130J	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	-	-	-	-	-	-	.022J	-	-	.021J	.021J	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	-	-	.004J	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachoroethene	-	-	-	-	-	-	-	.013J	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	.005J	.018	.038	.014	.11	-	-	.009J	-	.005J	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	-	-	.005J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003J
Xylenes (total)	-	-	.022	-	-	-	-	-	-	-	-	-	-	-	-	-	.003J	-	-	-	-
SEMIVOLATILES																					
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	.042J	-	.0005J	-	.0008J	-	-
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	.094J	-	.065J	-	-	-	-	-
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	.0005J	-
2,4-Dichlorophenol	-	-	-	-	-	-	-	-	-	1.3	-	-	.1J	.094J	.042J	.058J	-	-	.0001J	-	-
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	.054J	-	-	-	-	-	-
Naphthalene	-	0.062J	-	-	-	-	-	-	.13J	.36J	.17J	.04J	.048J	.12J	.11J	.07J	.005J	.003J	-	-	-
4-Chloro-3-Methylphenol	-	-	-	-	.2J	-	-	-	-	-	-	-	-	.08J	-	.04J	-	-	-	-	-
2-Methylnaphthalene	-	.046J	-	-	-	-	-	13J	.29J	.87J	.11J	.045J	.054J	.13J	.098J	.077J	.012	.006J	-	-	-
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.055J	-	-	-	-	-	-	-	-
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	.001J	.0007J	-	-	-
Acenaphthalene	-	.045J	-	-	.1J	-	-	-	-	-	-	-	-	.01J	.45J	.1J	-	-	-	-	-
Acenaphthene	-	-	-	-	.087J	-	-	-	.17J	.21J	.1J	-	-	-	.04J	-	.018	.013	-	-	-
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	.002J	-
Dibenzofuran	-	-	-	-	-	-	-	-	.23J	.27J	.11J	-	.041J	.068J	-	.041J	.01	.009J	-	-	-
Diethyl Phthalate	-	-	-	-	-	-	-	-	-	-	.45J	-	.034J	.04J	.036J	-	.001J	-	-	-	.002J
Fluorene	-	-	-	-	-	-	-	3.7J	.24J	.27J	.16J	-	-	.069J	.047J	.046J	.014	.011	-	-	-
N-Nitrosodiphenyl amine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	.064J	-	-	.018	-	-	-	-
Hexachlorobenzene	-	.098J	-	-	.24J	-	-	-	-	-	-	-	-	.68J	.16J	.38J	-	-	-	-	-

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Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1	.036J	-	-	-	-	-	-	-
Phenanthrene	.66	.26J	-	-	1.1	-	.67J	14J	3.6	4.3	1.3	.051J	.041J	1.5	.57J	.87	.045	.032	-	-	-
Anthracene	.12J	-	-	-	.26J	-	-	-	.63	.52J	.25J	-	.074J	.38J	.72	.25J	.005J	.003J	-	-	-
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.048J	.27J	.13J	.18J	.02	.017	-	-	-
Di-n-butyl phthalate	-	-	-	-	-	-	-	-	-	.17J	-	-	2	-	-	.039J	-	.0006J	-	-	-
Fluoranthene	2.3	.29J	-	2.7	1.6	.78J	2J	-	3.6	5.2	1.9	.05J	.49J	3.9	1.1	2.6D	.009J	.0005J	-	-	-
Pyrene	3.9J	.48	.5J	3.9J	1.9J	.87J	2.6J	-	3.4	4J	2J	.055J	.52J	3.7	1.5	2.3D	.002J	.001J	-	-	-
Butylbenzyl Phthalate	.18J	-	-	-	-	-	-	-	-	-	.23J	-	-	.22J	.08J	.18J	-	-	-	-	-
Benz(a)Anthracene	1.2J	.23J	-	.64J	1.1	-	1.7J	-	1.7	1.8	.95	-	.22J	2.1	1.4	4.3	-	-	-	-	-
bis(2-ethylhexyl) phthalate	6.1J	1.4	.6J	5	.27J	-	3.4J	-	4.3	1.6	2.5	-	1.6	2.3	2.1	1.7	-	-	-	-	-
Chrysene	2J	.36J	.33J	.83J	.99	1.7J	2.6J	-	1.6	1.8	1.1	.048J	.44J	3.4	2.2	2.2	-	-	-	-	-
Benzo(b)Fluoranthene	2.8J	.43J	.29J	.26J	1.2	-	5.3	-	1.8	1.7	1.2	.066J	.31J	4.8	2.3	3	-	-	-	-	-
Benzo(k)Fluoranthene	1.3J	.31J	-	.25J	.8J	1.3J	-	-	1.2	.53J	.85	-	.51J	3.5	1.5	2	-	-	-	-	-
Benzo(a)Pyrene	1.7J	.27J	-	.35J	.62J	.84J	21J	-	1.2	.83J	.99	-	.18J	3.1	1.8	1.9	-	-	-	-	-
Indeno(1,2,3-cd) Pyrene	1.4J	.32J	-	-	.53J	-	1.8J	-	.84	.83J	.76	-	.075J	3.1	1.1	1.8	-	-	-	-	-
Benzo(g,h,i)Perylene	-	.32J	-	-	.43J	-	1.8J	-	.8	.44J	-	-	.38J	3.5	1.2	1.9	-	-	-	-	-
Dibenz(a,h)Anthracene	.24J	-	-	-	-	-	-	-	.19J	-	.13J	-	.15J	-	.58J	-	-	-	-	-	-
PESTICIDES/PCBs																					
Alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.0011JP	.0054JP	.004J	1.2C	-	-	.000008 JP	.000079P	-
Beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.0026JP	.0098JP	.008JP	.032	-	.000009 JP	-	.00004JP	-
Delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.012JP	.044P	.019JP	.09P	.000005 JP	-	-	-	-
Gamma-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-	.19	.000036 JP	-	-	.000008J	.000004J
Heptachlor	-	-	4.8DC	-	-	-	.051	-	-	-	-	-	.17	.058	.037	.011JP	-	-	-	.000005 JP	.000015J
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.8PEC	.31P	.14P	.0059JP	-	-	-	-	-
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.03P	.021JP	.016JP	.039P	.000009 JP	-	-	-	-
Dieldrin	39	25	28	-	1.4J	4D	34DJ	27	.088	36	21	-	-	33UX	32	-	-	-	-	-	-

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4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.0062JP	.013JP	.0084JP	.0051JP	-	-	-	-	-
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	-	-	.0047JP	-	.000004J	-	-	-
Endosulfan Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.0084JP	-	-	-	-	-	-	-	-
4,4'-DDD	-	-	-	-	-	-	-	-	.049	1.5DJ	-	-	.0059JP	.012JP	.0068J	-	-	-	-	-	-
4,4'-DDT	-	-	-	-	-	-	-	-	.033J	1.7DJ	-	-	0.12	.0074JP	-	-	-	-	-	-	-
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	.021JP	.016JP	.0071JP	.0059JP	-	-	-	-	-
Endrin Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	.035JP	.018JP	.022J	-	-	-	-	-
alpha-Chlorodane	-	-	-	-	-	-	-	-	-	-	.027J	-	.046P	.056P	.061P	.0026JP	-	-	-	-	-
gamma'Chlorodane	.23J	-	1.7DJ	-	.16J	.35J	.43DJ	.14J	.0084J	-	.035J	-	.31PE	.33UX	.34	.012JP	.000009J	.000015 JP	-	-	-
INORGANICS																					
Antimony	13.4B	-	-	-	-	-	-	-	-	12.2B	-	-	6.5B	14.9B	14.5B	47.5	16.1B	-	-	-	-
Arsenic	13.7JN WB	6.2JNB	4.4JN	-	28.5J N	13.3JNB	28.9JNB	24.6J+N	18.6JN	27.8JN	5.5JN	8.4JN	30.9	17.9	18.7	25.3	27.8	46	14.9	30.9	-
Barium	121	83.9	456	828	178	585	197	345	304	571	159	116	447	177	172	246	631	476	27.7B	24.3B	40.1B
Beryllium	1.8	1.6	.56B	3.1	1.3	2.1	2.1B	1.7B	.45B	.74B	.89B	.48B	.7B	1.4B	1.3B	1B	-	-	1.8B	1.7B	.6B
Cadmium	28.7	27.6	14	13.7	87	76.2	344	330	5.7	6.4	14.1	-	19.2	35.3	33.4	37.3	-	-	3150	193	29.2
Chromium,trivalent hexavalent	51.6	48	33.3	397	56.6	83	76.6	455	29.5	90.1	46.9	15.3	68.1	77.7	63.1	44.8	-	-	-	7.2B	-
Cobalt	14	6.7B	3.2B	27.6B	11.5B	9.1B	6.5B	11B	3.3B	4.1B	3.6B	6.3B	9.9B	10.5B	10.1B	10.5B	-	-	91.4	53.7	56.5
Copper	1,530J*	688J*	112J*	84.8J*	618J*	457J*	728J*	446J*	144J*	359J*	187J*	16.9J*	336	1,660	966	452	3.3B	1.9B	4.5B	100	55.7
Lead	523JN	1,790JN	526JN	281JN	3,510 JN	1,300JN	1,667JN	2,200JN	669JN	1,800JN	2,030JN	35.3JN	1,010	667	793	1,200	203B	1.6B	2.8B	1.5B	3.8
Manganese	3,960	2,650	462	1,830	883	254	930	735	182	118	754	785	806	1,820	1,630	481	3,070	4,180	11,500	6,070	3,130
Mercury	.4JN	.6JN	5.3JN	-	6.4JN	2.7JN	8.8JN	12JN	6.2JN	10JN	.5JN	-	2.1	.8	.5	.2	-	-	-	-	-
Nickel	59.4	32	22.2	78.7	39.3	8.2B	21.9B	26.6	8.9B	3B	13.9	15.7	40.4	56.2	60.9	28.2	-	-	236	183	106
Selenium	-	-	.35JN WB	-	-	-	3.1JNB	1.8JNB	.57 JNWB	.91 JNWB	-	-	1.3B	1.4B	1.1B	.7B	-	-	1.6B	-	-
Silver	31.5J*N	2.2J*NB	1.4J*N B	3.4J*NB	6.6 J*N	6J*N	12J*N	7.2J*N	2.2J*N	2.6J*NB	3.9J*N	-	.9B	4.3	9.1	1.1B	-	-	-	-	-
Thallium	1.2J+B	-	-	-	2J+B	-	2.4JWB	1.3JWB	.7JWB	-	-	-	-	.4B	.6B	.2B	-	-	-	-	.6B
Vanadium	59.3	58.2	38.3	124	43.6	118	85.4	77.2	28.5	61.4	45.8	21.5	68.7	66.7	64	54.2	2.1B	2.8B	5.8B	18.2B	-

Table 1 - Summary of Analyses Conducted at the Swift Agrichemical Facility

Compound/CV	1989 Samples taken by E & E (results in ppm)												Sample Date June 4 and 5, 1996 (results in ppm)								
	Soil	Soil	OS Sed	Sub-Soil	Soil	ONS Sed	OS Sed	OS Sed	OS Sed	OS Sed	OS Sed	SOIL (BKG)	X101	X102	X103	X104	G101	G102	G103	G104	G105
Zinc	8,210	27,400	3,760	2,660	21,600	6,230	32,700	23,400	839	1,370	1,680	147	4,590	9,320	9,480	16,000	10.2B	98	121,000	31,500	731
Cyanide	-	2.0JN	-	4.2JN	1.1JN	2.3JN	-	-	-	-	-	-	2.7	1.2	1	1.2	.98	2.7B	5.6	27.2	7

ppm - parts per million
-: coinpound analyzed, but not detected in the sample

Table 2 - Onsite Soil and Sediment Contaminants of Concern for Swift Agricultural Chemical Facility

Compound/CV	Soil	Soil	Sub-Soil	Soil	ONS Sod	SOIL (BKG)	X101	X102	X103	X104	Field Blank	Comparison Value Soil (ppm)	Source
	S1	S2	S4	S5	S6	S12							
SEMIVOLATILES													
Benzo(a)Pyrene	1.7J	.27J	.35J	.62J	.84J	-	.18J	3.1	1.6	1.9	-	0.1	CREG
PESTICIDES/PCBs													
Heptachlor	-	-	-	-	-	-	.17	.059	.037	.011JP	-	0.2	CREG
Aldrin	NA	NA	NA	NA	NA	NA	3.9PEC	.31P	.14P	.0059JP	-	0.06/2/20	RMEG
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	.03P	.021JP	.016JP	.039P	-	0.08	CREG
Dieldrin	.39	.25	-	1.4J	4D	-	-	.33UX	.32	-	-	0.1/3/40:0.04	CEMEG/ CREG
INORGANICS													
Antimony	13.4B	-	-	-	-	-	6.5B	14.9B	14.5B	47.5	-	0.8/20/300	RMEG
Arsenic	13.7JNWB	6.2JNB	- -	28.5JN	13.3JNB	8.4JN	30.9	17.9	18.7	25.3	-	0.6/20/200	C EMEG
Beryllium	1.8	1.6	3.1	1.3	2.1	.48B	.7B	1.4B	1.3B	1B	-	0.2	CREG
Cadmium	28.7	27.8	13.7	67	76.2	-	19.2	35.3	33.4	37.3	-	1/40/500	C EMEG
Lead	523JN	1790JN	281JN	3510JN	1300JN	35.3JN	1,010	887	793	1,200	1.6B	NONE	NONE
Manganese	3980	2650	1830	883	254	785	806	1,820	1,830	481	1B	300/7,000/100,000	rmeg
Thallium	1.2J+B	-	-	2J+B	-	-	-	.4B	.6B	.2B	-	NONE	NONE
Zinc	8,210	27,400	2,660	21,600	8,230	147	4,590	9,320	9,480	16,000	17.8B	600/20,000/200,000	I EMEG & RMEG

NA: Compound not analyzed for in the sample.
- : Compound analyzed, but not detected in the sample.
ppm - parts per million

Table 3 - Off-site Sediment Contaminants of Concern for Swift Agricultural Chemical Facility (in ppm)

Compound/CV	OS Sed S3	OS Sed S7	OS Sed S8	OS Sed S9	OS Sed S10	OS Sed S11	Field Blank	Comparison Value	
								Soil Concentration	Source
SEMIVOLATILES									
Benzo(a)Pyrene	-	21J	-	1.2	.63J	.99	-	0.1	CREG
PESTICIDES/PCBs									
Heptachlor	4.8DC	.051	-	-	-	-	-	0.2	CREG
Aldrin	NA	NA	NA	NA	NA	NA	-	0.06/2/20	RMEG
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	-	0.08	CREG
Dieldrin	.29	.34DJ	.27	.088	.36	.21	-	0.1/3/40:0.04	CEMEG/CREG
INORGANICS									
Antimony	-	-	-	-	12.2B	-	-	0.8/20/300	RMEG
Arsenic	4.4JN	26.9JNB	24.6J+N	18.6JN	27.8JN	5.5JN	-	0.6/20/200	C EMEG
Beryllium	.56B	2.1B	1.7B	.45B	.74B	.89B	-	0.2	CREG
Cadmium	14	344	330	5.7	6.4	14.1	-	1/40/500	C EMEG
Lead	526JN	1,667JN	2,200JN	669JN	1,800JN	2,030JN	1.6B	NONE	NONE
Manganese	462	930	735	182	118	754	1B	300/7,000/100,000	rmeg
Thallium	-	2.4JWB	1.3JWB	.7JWB	-	-	-	NONE	NONE
Zinc	3,760	32,700	23,400	839	1,370	1,680	17.8B	600/20,000/200,000	I EMEG & RMEG

NA: Compound not analyzed for in the sample.
- : Compound analyzed for, but not detected in the sample.
ppm - parts per million

Table 4 - June 4 and 5, 1996 Groundwater Sample Results (in ppb).								
Compound/CV	G101	G102	G103	G104	G105	Field Blank	Comparison Value for Water (ppb)	Source
SEMIVOLATILES								
Benzo(a)Pyrene	-	-	-	-	-	-	0.000005	CREG
PESTICIDES/PCBs								
Heptachlor	-	-	-	.000005JP	.000015J	-	0.000008	CREG
Aldrin	-	-	-	-	-	-	0.000002/0.0003	CREG/CEMEG
Heptachlor Epoxide	.000009JP	-	-	-	-	-	0.000004	CREG
Dieldrin	-	-	-	-	-	-	0.000002	CREG
INORGANICS								
Antimony	0.016B	-	-	-	-	-	0.004/0.010	RMEG
Arsenic	0.0278	0.046	0.015	0.031	-	-	0.003/0.010 0.00002	CEMEG CREG
Beryllium	-	-	0.0018B	0.0017B	.0006B	-	0.000008	CREG
Cadmium	-	-	3.150	0.193	0.029	-	0.07/0.02	CEMEG
Lead	0.203B	0.0016B	0.0028B	0.0015B	0.0038	0.0016B	NONE	NONE
Manganese	3.070	4.180	11.500	6.070	3.130	0.001B	0.050/0.200	RMEG
Thallium	-	-	-	-	.0008B	-	0.0004	LTHA
Zinc	0.0102B	0.009B	121.0	31.500	0.731	0.0178B	3/10	I EMEG

- Compound not detected in the sample.
ppb = parts per billion

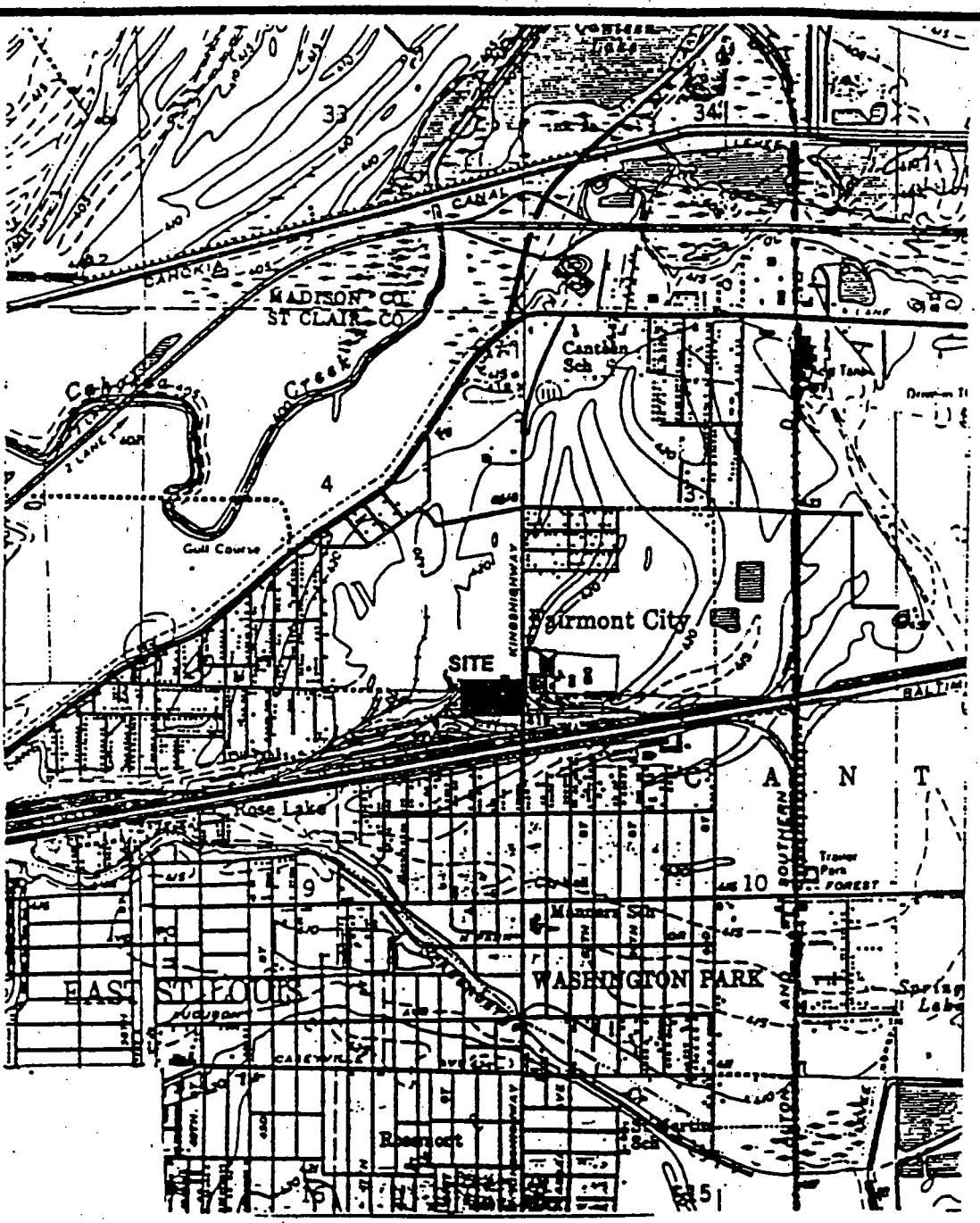
Table 5 - Calculated Doses and a Comparison to Health Guidelines

Compound/CV	Sediment Concentration Range (in ppm)	Estimated Ingestion Dose (in mg/kg/day)	Health Guidelines		USEPAs Oral Slope Factor	Estimated Increased Cancer Risk	Exceeds The MRL/RfD
			Source	Health Guideline for Soil in mg/kg/day			
SEMIVOLATILES							
Benzo(a)Pyrene	ND - 21J	2.6×10^{-6}	Acute Oral MRL	0.1	7.3	1.9×10^{-5}	NO
PESTICIDES/PCBs							
Heptachlor	ND - 4.8DC	6×10^{-7}	C.O. MRL	0.0005	4.5	2.7×10^{-6}	NO
Aldrin	NA/3.9 (3)	NE/4.9×10^{-7}	Chronic Oral MRL	NE	17	NE/8.3×10^{-6}	NO
Heptachlor Epoxide	NA/0.039(3)	NE/4.9×10^{-9}	C.O. MRL	0.000013	9.1	NE/4.5×10^{-8}	NO
Dieldrin	0.088-0.36	4.5×10^{-8}	C.O. MRL	.00005	16	7.2×10^{-7}	NO
INORGANICS							
Antimony	ND-12.2	1.5×10^{-6}	Chronic Oral RFD	0.0004	N Appl	N Appl	NO
Arsenic	4.4JN-27.8JN	3.4×10^{-6}	Chronic Oral MRL	0.0003	1.5	5.1×10^{-6}	NO
Beryllium	0.45B-2.1B	2.6×10^{-7}	Chronic Oral RFD	0.005	4.3	1.1×10^{-6}	NO
Cadmium	5.7-344	4.3×10^{-5}	C.O. MRL	0.0007	None	None	NO
Lead	526-2,200	2.7×10^{-4}	NAV	NAV	NAV	-	NO
Manganese	182-930	1.16×10^{-4}	NAV	NAV	N Appl	N Appl	NO
Thallium	ND-2.4JWB	3.0×10^{-6}	NAV	NAV	N Appl	N Appl	NO
Zinc	17.8B-32700	4×10^{-3}	C.O. MRL	0.3	N Appl	N Appl	NO
Total Cancer Risk						3.6×10^{-5}	NO

NA: Compound not analyzed for in the sample.
1 - See attached sheet with calculations and assumptions
2 - Calculated using highest sediment concentration
NE - Not estimated
N Appl - Not Applicable
NAV - Not Available
3 - Highest On-site soil results substituted twice it was not analyzed for in sample
4 - Assumes similar mechanisms and cancer types

Table 6. Completed Exposure Pathways

Pathway Name:	Source	Medium	Exposure Point	Exposure Route	Receptor Population	Time of Exposure	Exposure Activities	Estimated Number Exposed	Chemicals (identify by name or reference to table in document)
On-site Surface Soil & Sediment	Contaminated Soil & Sediment	Soil & Sediment	On the site	Ingestion Inhalation	On-site Workers	Past Present Future	Working outside on the site	25	Table 2
Off-site Sediment	Contaminated sediment off the site	Sediment	Children playing in sediment areas.	Ingestion Inhalation	Area Children	Past Present Future	Playing in and with sediments	20	Table 3



SOURCE: Ecology and Environment, Inc. 1990; BASE MAP: USGS, Monks Mound, IL Quadrangle, 7.5 Minute Series, 1954, photorevised 1974.

Figure 1 - Swift Agricultural Chemicals Corporation Site Location Map

Source: E & E, 1995

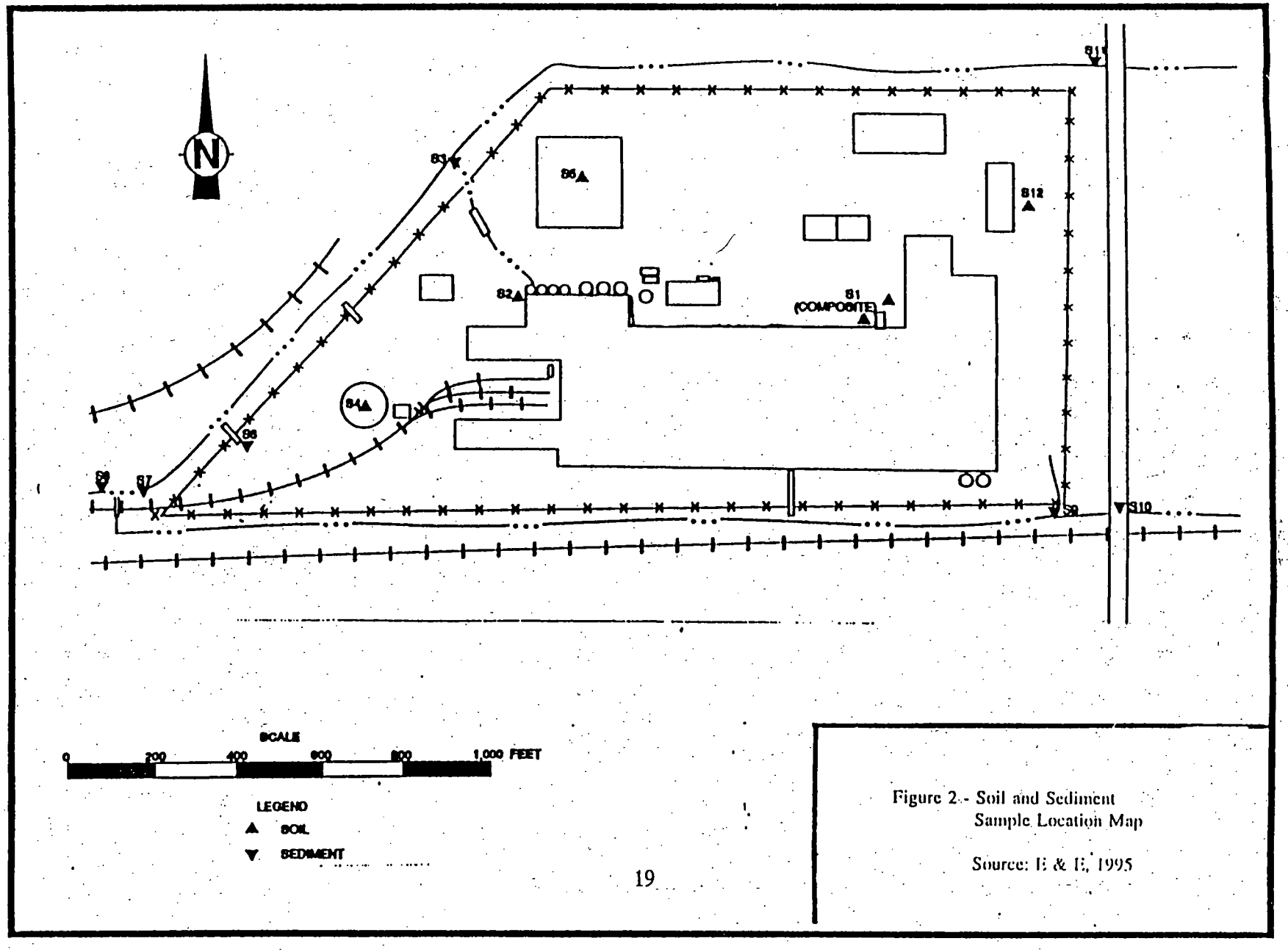
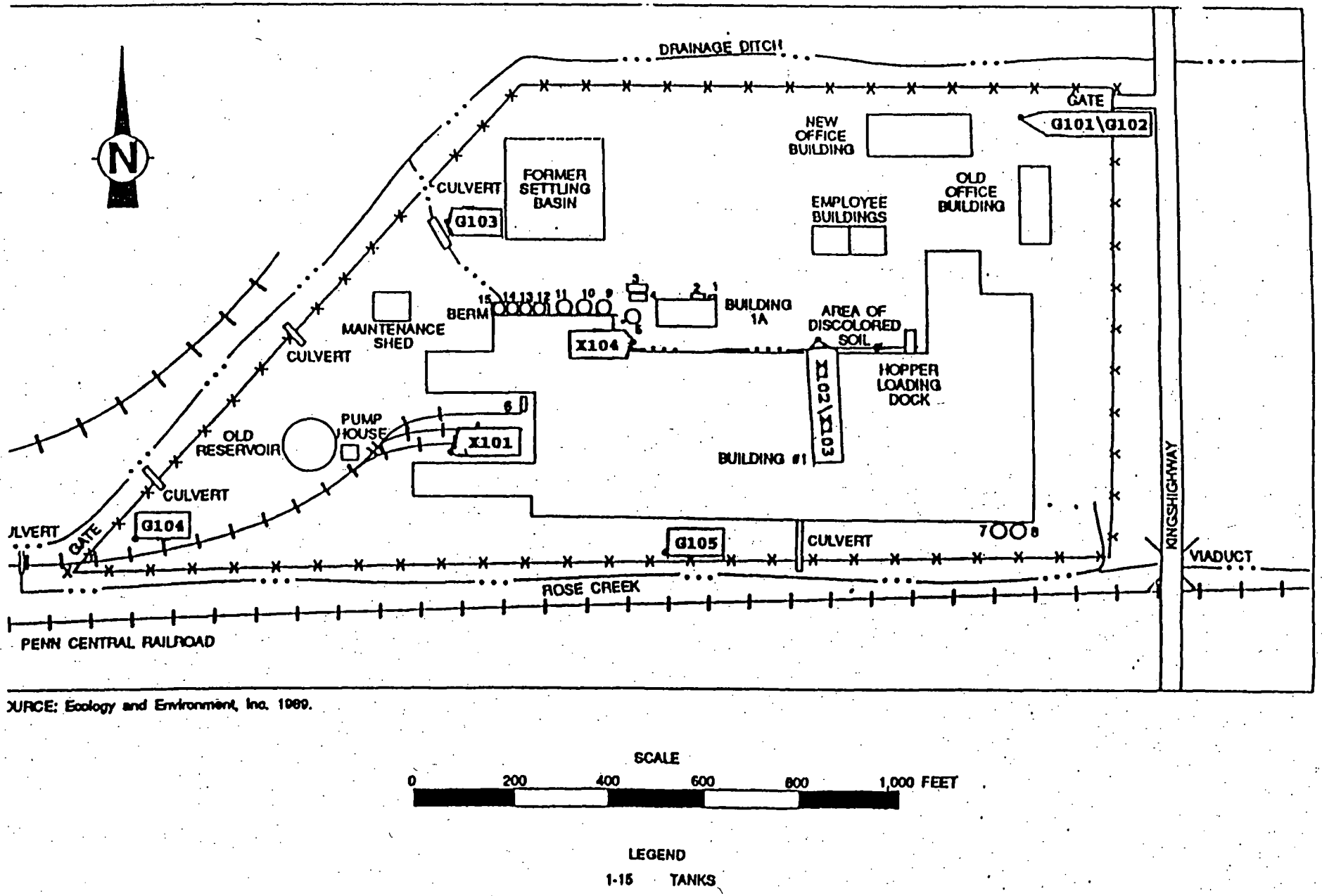


Figure 2 - Soil and Sediment Sample Location Map

Source: E & E, 1995



SOURCE: Ecology and Environment, Inc. 1989.

SCALE

0 200 400 600 800 1,000 FEET

LEGEND

1-15 TANKS

Figure 3 - Soil and Groundwater Samples taken by IEPA in 1996

ATTACHMENT 1

CONCLUSIONS AND RECOMMENDATIONS FROM OLD AMERICAN ZINC HEALTH CONSULTATION

CONCLUSIONS

Based on information reviewed, the Illinois Department of Public Health concludes that:

1. The Old American Zinc site in Fairmont City, Illinois poses a public health threat based on chronic exposure of children to arsenic, cadmium, and lead in the residential soils.

2. Nearby residents are exposed to contaminated airborne particulates which originate onsite. This exposure would be the highest during dry windy periods or when site activity is high. The extent of this exposure and resulting health effects (if any) cannot be determined without sufficient air monitoring data.

3. Worker exposure to on-site contaminants certainly occurs. The highest exposures would likely occur during activities which disturb the waste material.

4. Exposures to site related contaminants would have likely been higher in the past, particularly during smelter operation.

RECOMMENDATIONS

Cease/Reduce Exposure Recommendations

1. Reduce exposure of children to contaminated residential soils as much as possible by using appropriate reduction methods (e.g. covering bare soil with vegetation, "clean" soil, mulch, rock, or asphalt; restricting access to areas with bare soil by fencing; reducing or eliminating soil contact activities such as digging; washing hands and face prior to eating or drinking; and cleaning shoes to reduce the amount of soil being tracked into the house.

2. Remove or contain contaminants that have been left exposed on the surface soil in such a way that they are not released to the air or allowed to move by surface run-off.

3. Protect both the on-site workers and nearby residents from site contaminant exposure by taking precautions (e.g. dust reduction methods, protective equipment) to reduce exposures during any on-site activities that involve disturbing the site wastes.

Site Characterization Recommendations

1. Monitoring of air at exposure points to determine airborne exposure to contaminants. Exposure points would include nearby residences and, if warranted, onsite workers. Baseline air monitoring would be important in determining exposure and could later be used with additional air monitoring to determine the effectiveness of the chosen remedial activity.

2. Performing additional soil sampling in the neighborhoods adjacent to the site to provide a more accurate determination of the extent of off-site soil contamination.

3. Performing additional sampling for mercury in the arsenic leaching area to determine the extent of mercury contamination in that area.

ATTACHMENT 2

Comparison Values Used in Screening Contaminants for Further Evaluation

Environmental Media Evaluation Guides (EMEGs) are developed for chemicals based on their toxicity, frequency of occurrence at National Priority List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not cut off levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides (RMEGs) are estimates of a daily oral or inhalation exposure to a particular chemical that is unlikely to produce any noncarcinogenic adverse health effects over a lifetime. They are conservative values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations based on a one excess cancer in a million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

ATTACHMENT 3

Calculations for Exposure to Off-site Sediments
Based on a 16 kilogram Child

$$\text{Ingestion Dose (ID)} = \frac{\text{Concentrations X Ingestion Rate (IR) X Exposure Factor (EF) X } 10^{-6}}{\text{Body Weight (BW)}}$$

Where IR is 100 mg; BW is 16 kg; and the EF is 0.02

EF = Exposure Frequency X Exposure Duration/Exposure Time
EF = 2 days/week X 26 weeks X 10 years/365 days X 70 years
EF = 520/25550
EF = 0.02

$$\text{ID} = \text{concentration x } \frac{(\text{IR X EF X } 10^{-6})}{\text{BW}}$$

ID = Concentration (0.125×10^{-6})

ID = (Concentration) 1.25×10^{-7}

Antimony

ID = 12.2 (1.25×10^{-7}/day)
= 1.5×10^{-6} mg/kg/day

Arsenic

ID = 27.8 mg/kg (1.25×10^{-7}/day)
= 3.4×10^{-6} mg/kg/day

Beryllium

ID = 2.1 mg/kg (1.25×10^{-7}/day)
= 2.6×10^{-7} mg/kg/day

Cadmium

ID = 344 mg/kg (1.25×10^{-7}/day)
= 4.3×10^{-5} mg/kg/day

Lead

ID = 2,200 mg/kg (1.25×10^{-7}/day)
= 2.75×10^{-4} mg/kg/day

Manganese

ID = 930 mg/kg (1.25×10^{-7}/day)
= 1.16×10^{-4} mg/kg/day

Thallium

ID = 2.4 mg/kg (1.25×10^{-7}/day)
= 3.0×10^{-6} mg/kg/day

Zinc

ID = 32,700 mg/kg (1.25×10^{-7}/day)
= 4.0×10^{-3} mg/kg/day

Benzo(a)pyrene

ID = 21 mg/kg (1.25×10^{-7}/day)
= 2.6×10^{-6} mg/kg/day

Heptachlor

ID = 4.8 mg/kg (1.25×10^{-7}/day)
= 6×10^{-7} mg/kg/day

Heptachlor epoxide[1]

ID = 0.039 mg/kg (1.25×10^{-7}/day)
= 4.9×10^{-9} mg/kg/day

Aldrin[1]

ID = 3.9 mg/kg (1.25×10^{-7}/day)
4.9×10^{-7} mg/kg/day

Dieldrin

ID = 0.36 mg/kg (1.25×10^{-7}/day)
4.5×10^{-8} mg/kg/day

[1] - Not analyzed for in off-site sediment, concentration used is highest on-site soil.